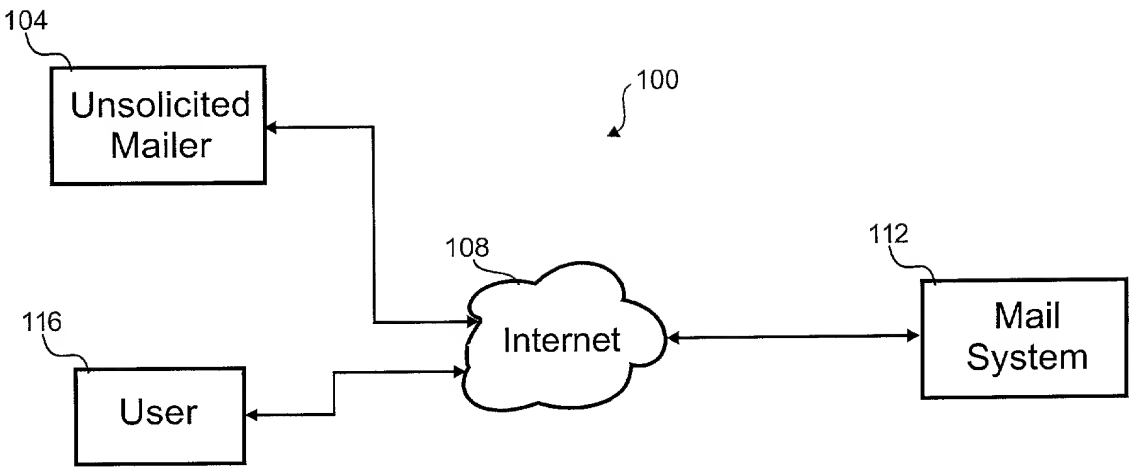
104
Unsolicited Mailer
100
108
112
Internet
Mail System
116
User

Fig. 1

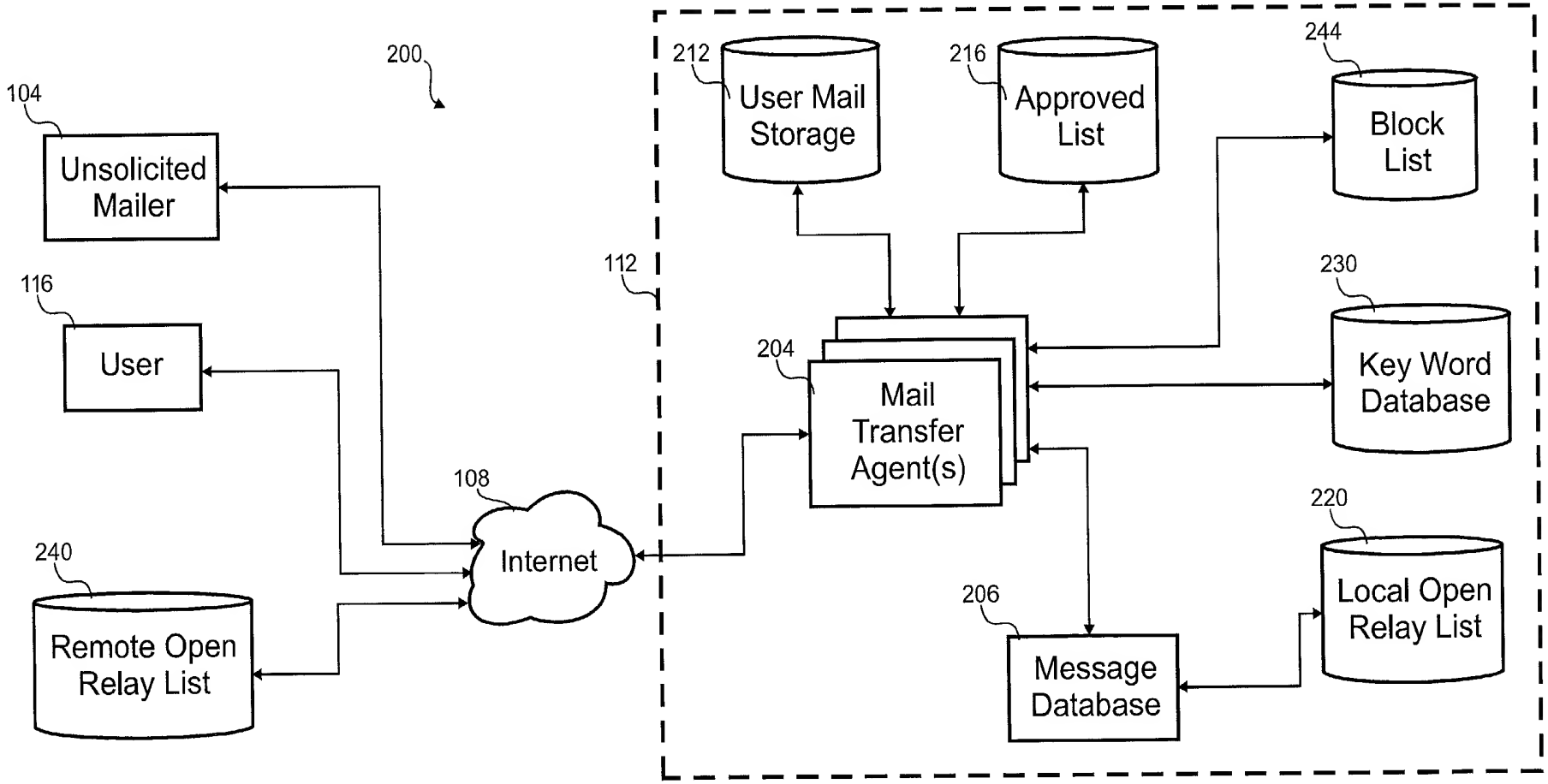
200
104
Unsolicited Mailer
116
User
240
Remote Open Relay List
108
Internet
112
212
User Mail Storage
216
Approved List
244
Block List
230
Key Word Database
204
Mail Transfer Agent(s)
220
Local Open Relay List
206
Message Database

Fig. 2

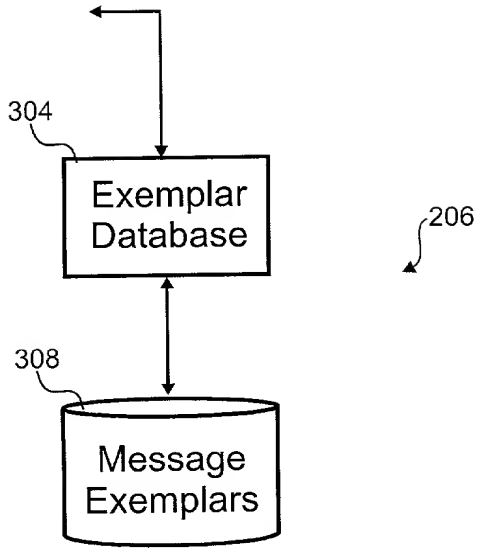
304
Exemplar Database
206
308
Message Exemplars

Fig. 3A

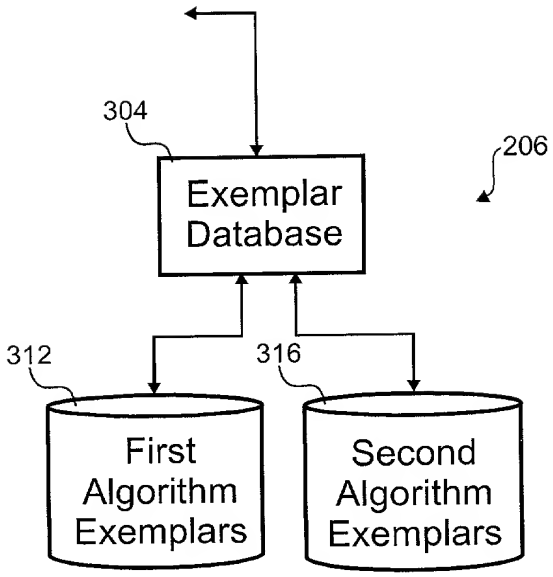
304
Exemplar Database
206
312
316
First Algorithm Exemplars
Second Algorithm Exemplars

Fig. 3B

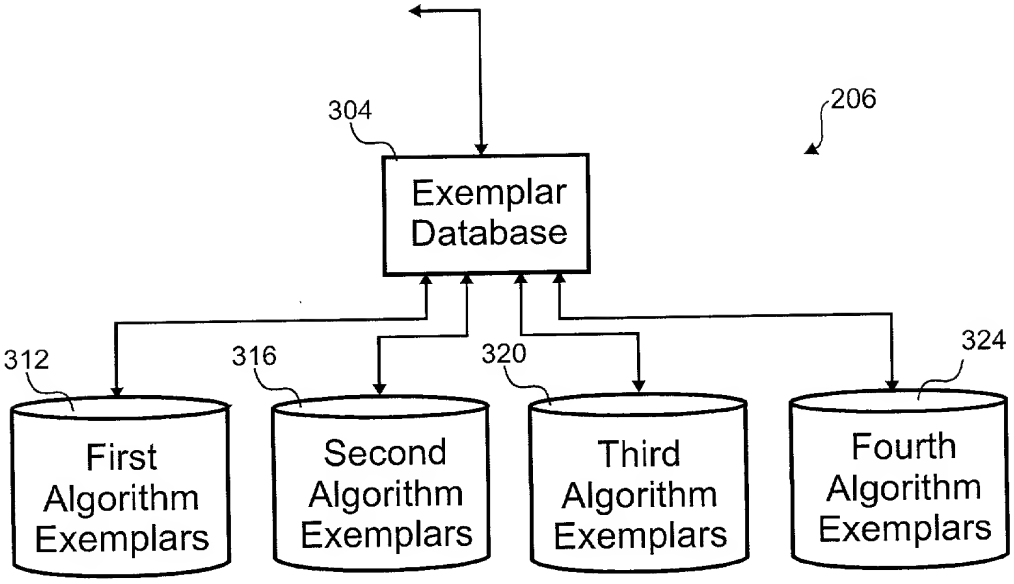
304
206
Exemplar Database
312
316
320
324
First Algorithm Exemplars
Second Algorithm Exemplars
Third Algorithm Exemplars
Fourth Algorithm Exemplars

Fig. 3C

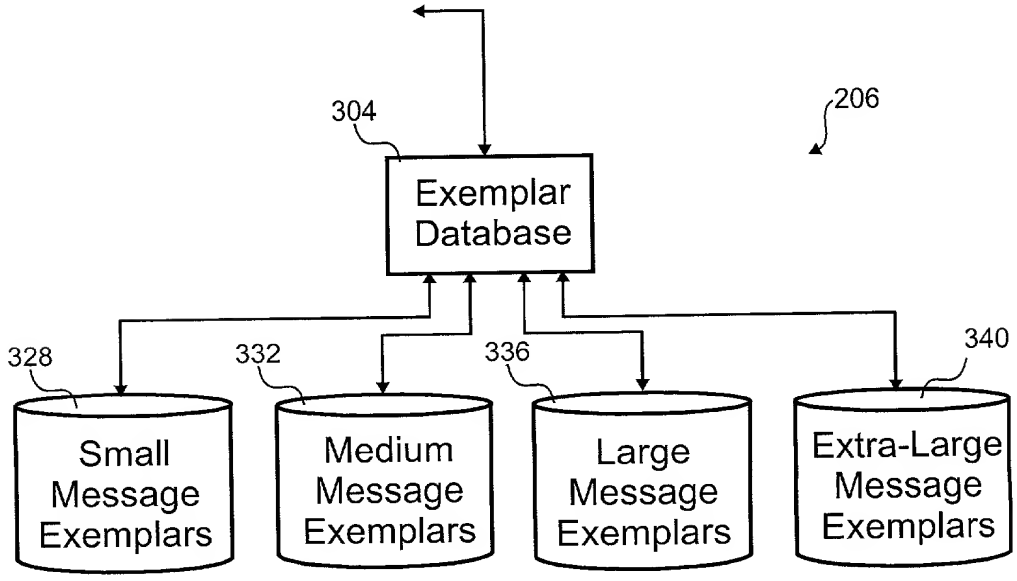
304
206
Exemplar Database
328
332
336
340
Small Message Exemplars
Medium Message Exemplars
Large Message Exemplars
Extra-Large Message Exemplars

Fig. 3D

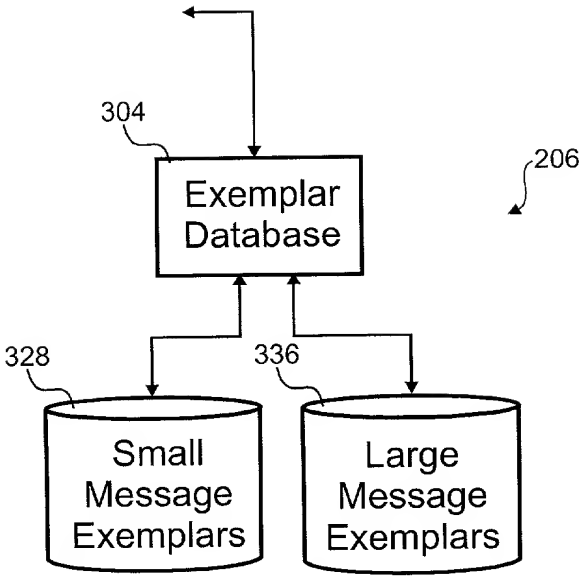
304
206
Exemplar Database
328
336
Small Message Exemplars
Large Message Exemplars

Fig. 3E

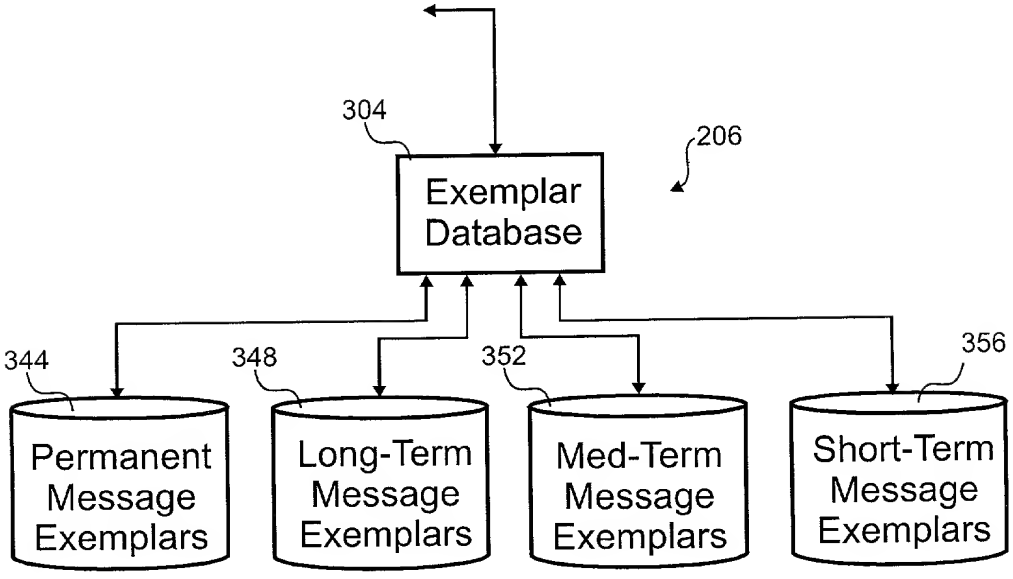
304
206
Exemplar Database
344
348
352
356
Permanent Message Exemplars
Long-Term Message Exemplars
Med-Term Message Exemplars
Short-Term Message Exemplars

Fig. 3F

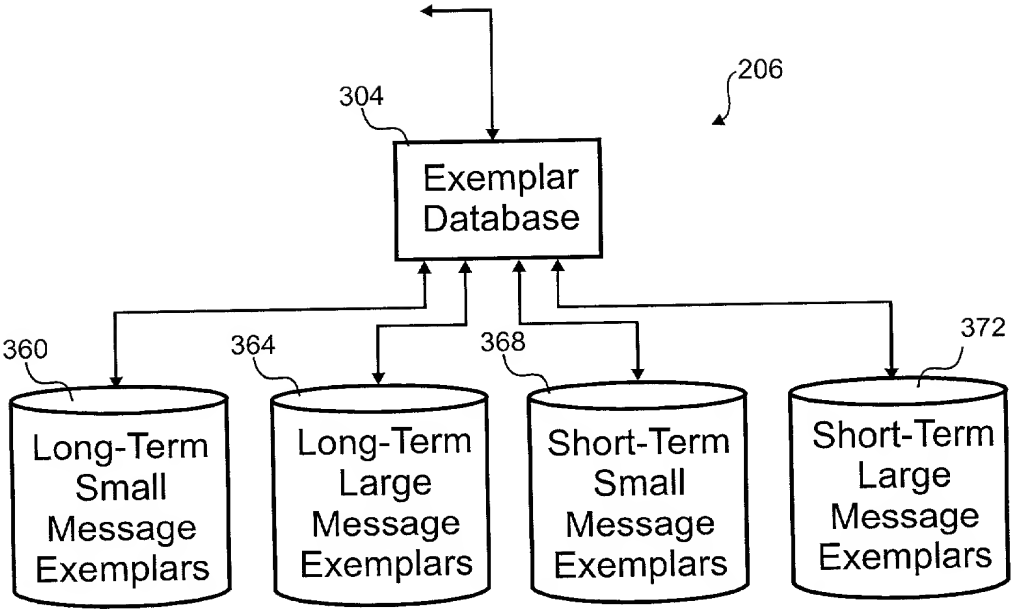
206
304
Exemplar Database
360
364
368
372
Long-Term Small Message Exemplars
Long-Term Large Message Exemplars
Short-Term Small Message Exemplars
Short-Term Large Message Exemplars

Fig. 3G

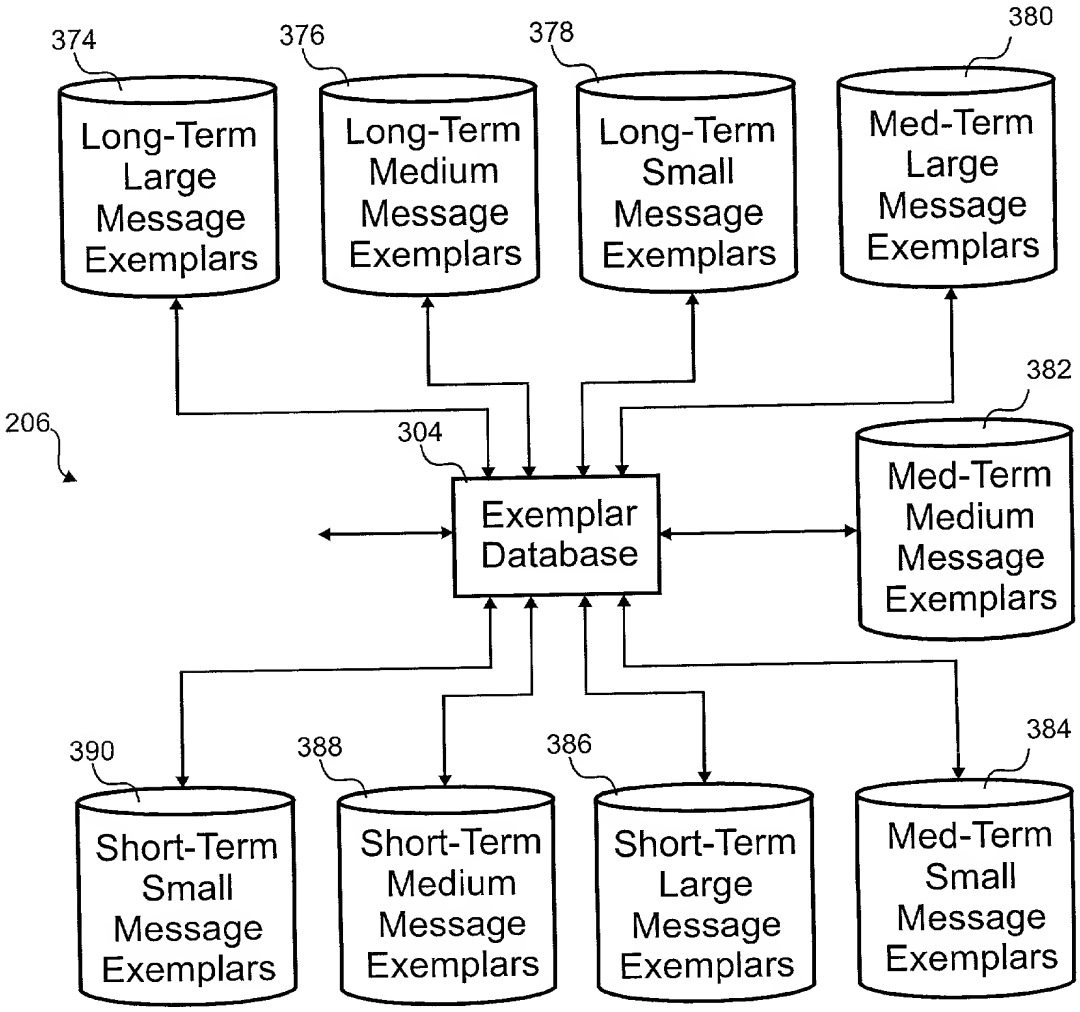
374
376
378
380
Long-Term Large Message Exemplars
Long-Term Medium Message Exemplars
Long-Term Small Message Exemplars
Med-Term Large Message Exemplars
206
304
382
Exemplar Database
Med-Term Medium Message Exemplars
390
388
386
384
Short-Term Small Message Exemplars
Short-Term Medium Message Exemplars
Short-Term Large Message Exemplars
Med-Term Small Message Exemplars

Fig. 3H

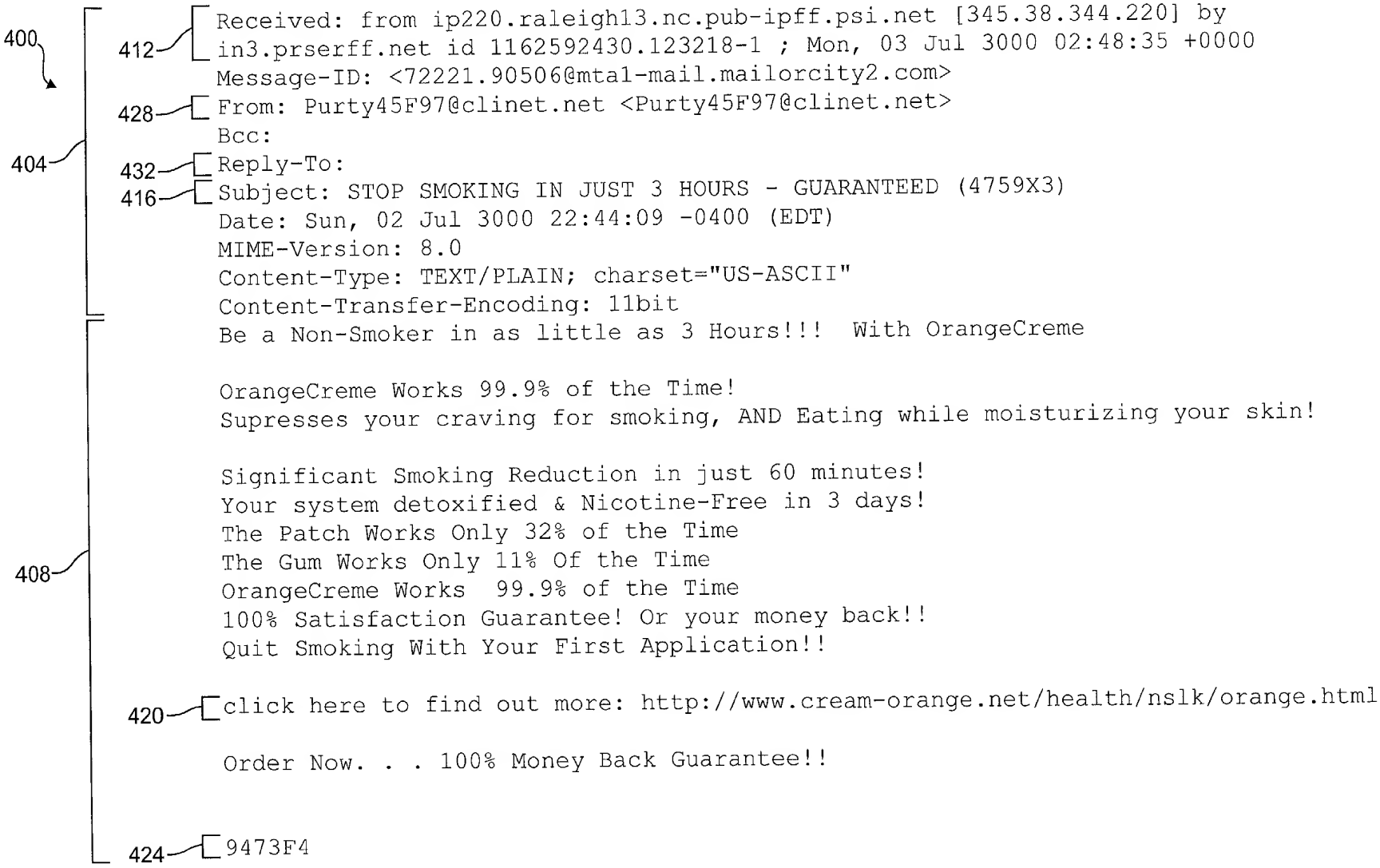

Fig. 4 (Prior Art)

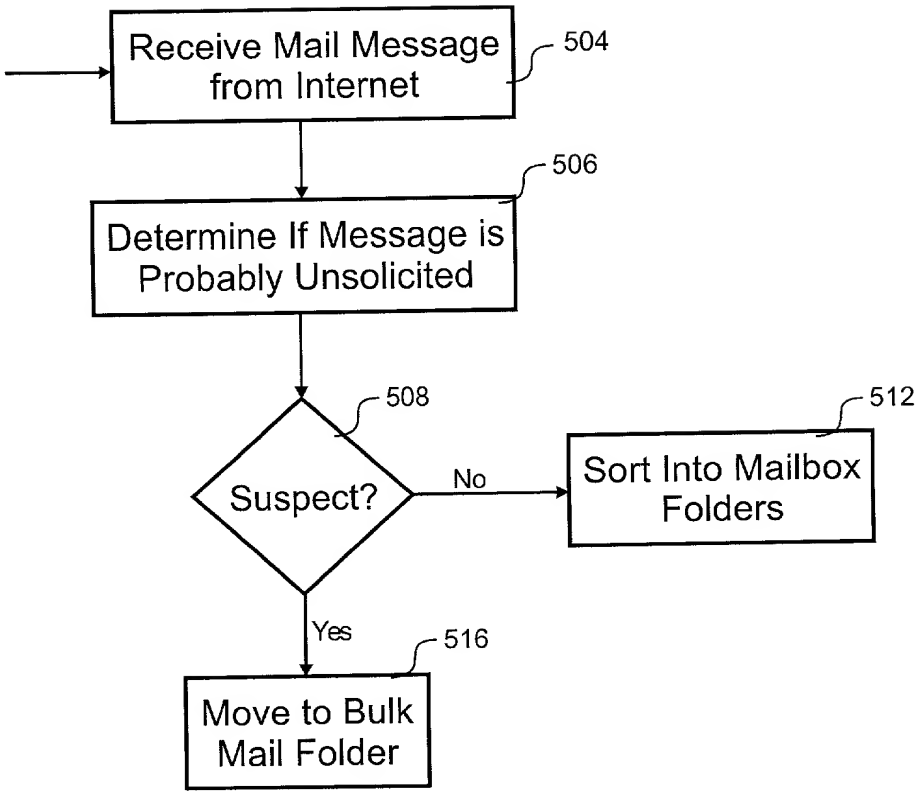
Receive Mail Message from Internet
504
Determine If Message is Probably Unsolicited
506
Suspect?
508
No
Sort Into Mailbox Folders
512
Yes
Move to Bulk Mail Folder
516

Fig. 5A

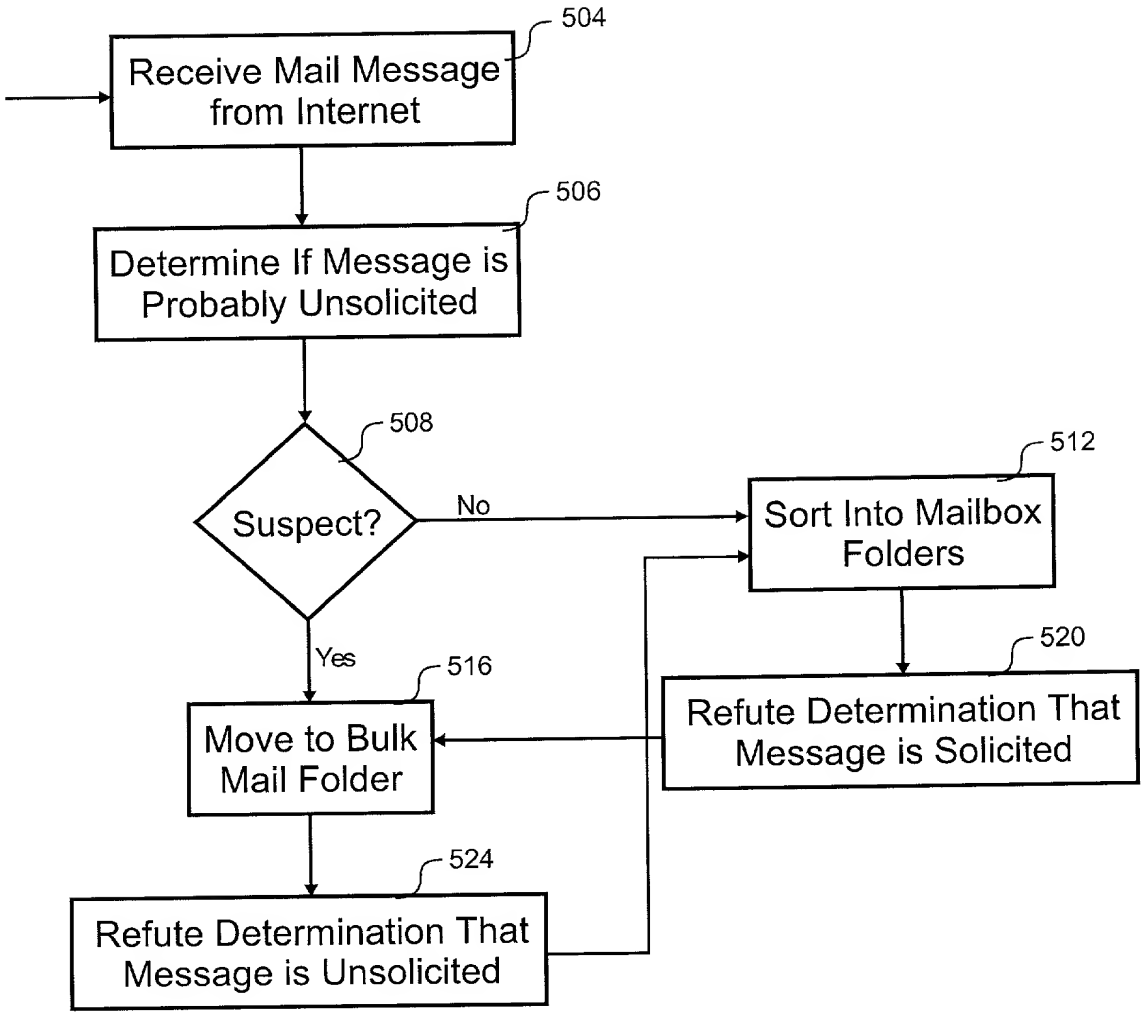
504
Receive Mail Message from Internet
506
Determine If Message is Probably Unsolicited
508
Suspect?
No
512
Sort Into Mailbox Folders
Yes
516
Move to Bulk Mail Folder
520
Refute Determination That Message is Solicited
524
Refute Determination That Message is Unsolicited

Fig. 5B

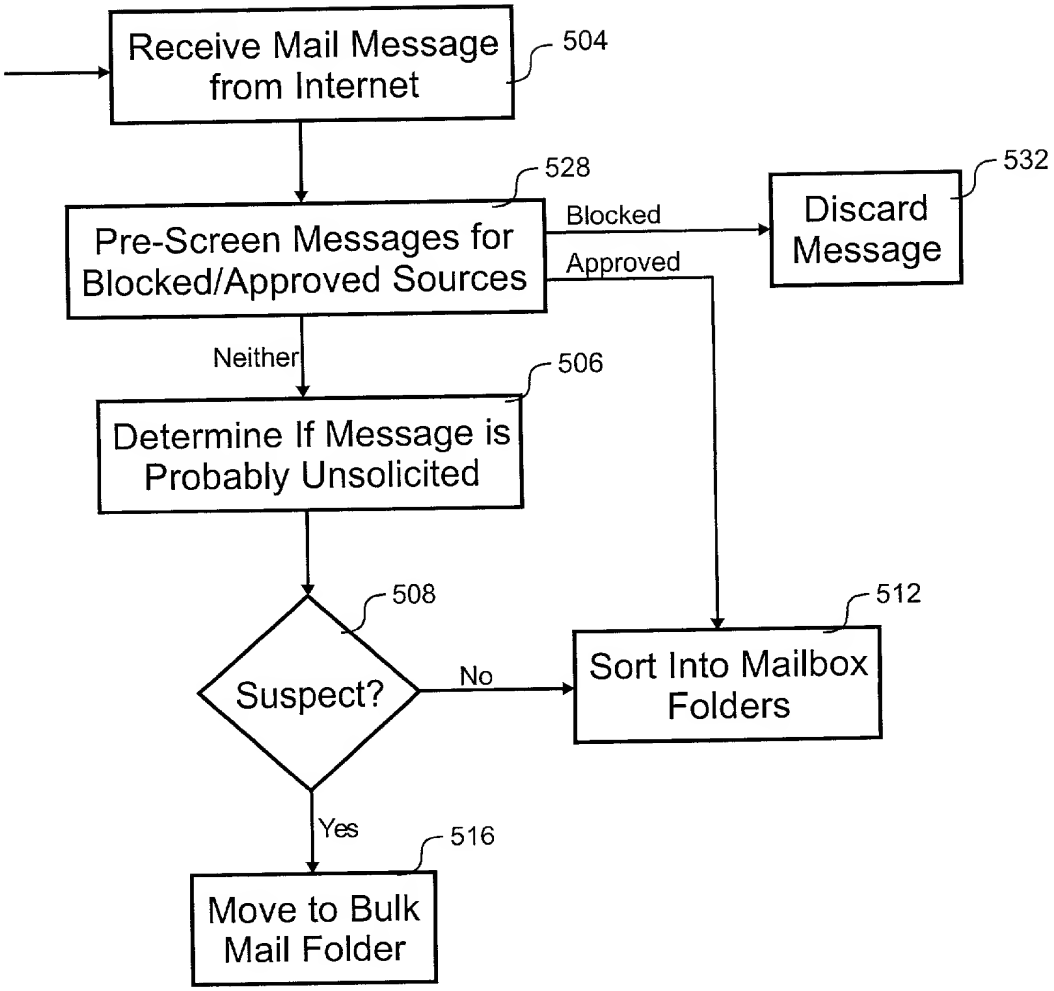
Receive Mail Message from Internet
504
Pre-Screen Messages for Blocked/Approved Sources
528
Blocked
Discard Message
532
Approved
Neither
Determine If Message is Probably Unsolicited
506
Suspect?
508
No
Sort Into Mailbox Folders
512
Yes
Move to Bulk Mail Folder
516

Fig. 5C

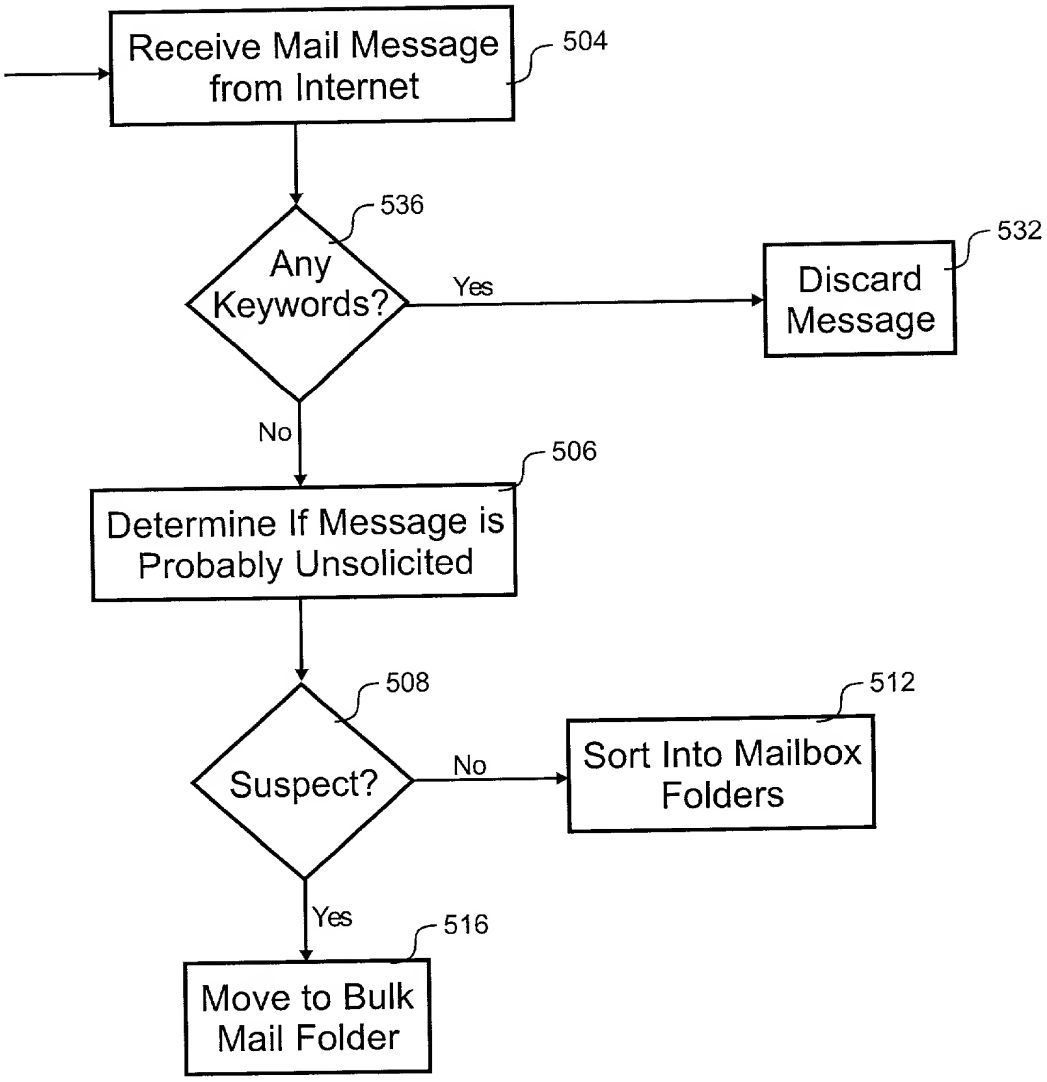
Receive Mail Message from Internet
504
536
Any Keywords?
Yes
Discard Message
532
No
506
Determine If Message is Probably Unsolicited
508
Suspect?
No
Sort Into Mailbox Folders
512
Yes
516
Move to Bulk Mail Folder

Fig. 5D

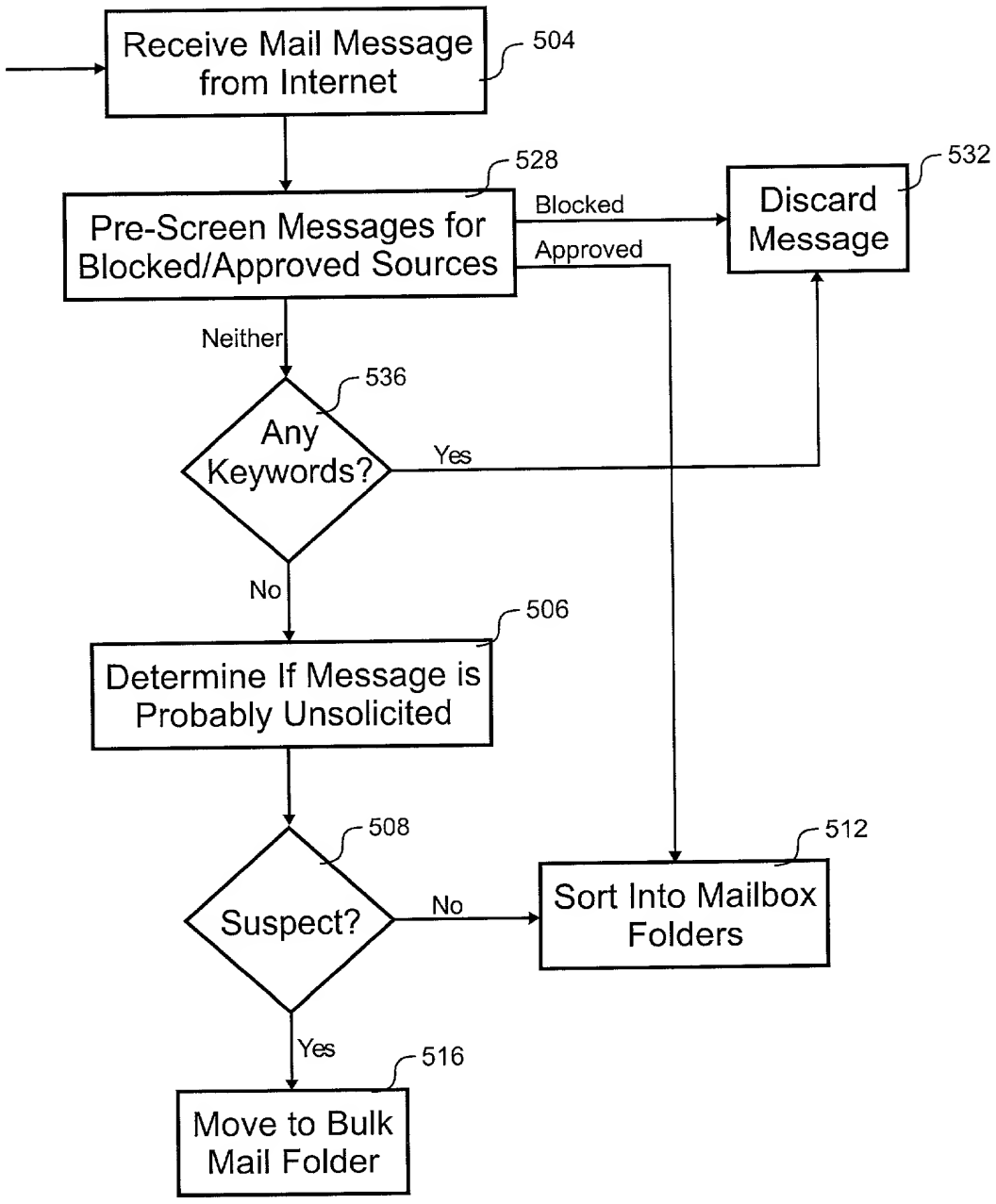
Receive Mail Message from Internet
504
Pre-Screen Messages for Blocked/Approved Sources
528
Blocked
Approved
Discard Message
532
Neither
Any Keywords?
536
Yes
No
Determine If Message is Probably Unsolicited
506
Suspect?
508
No
Sort Into Mailbox Folders
512
Yes
Move to Bulk Mail Folder
516

Fig. 5E

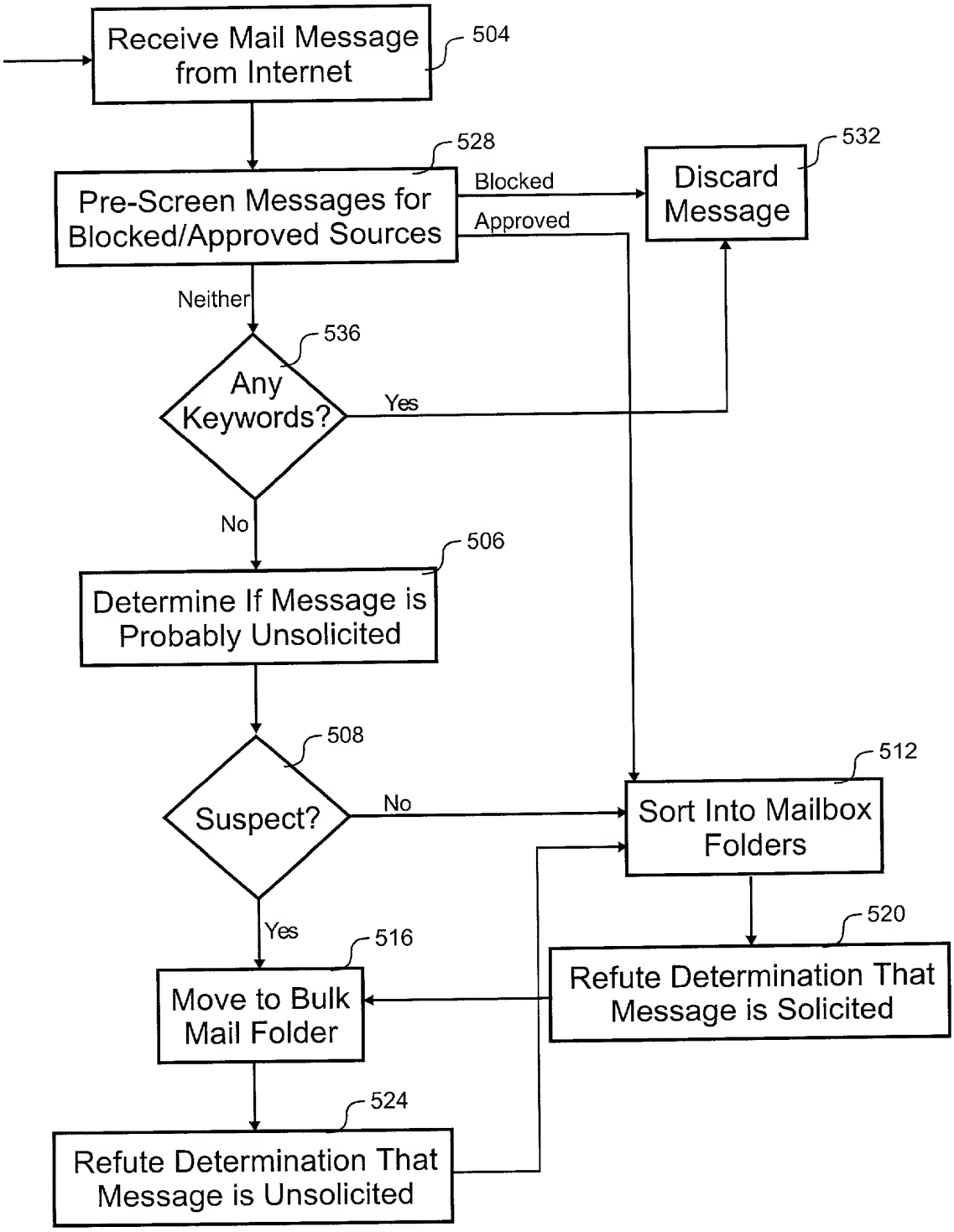
Receive Mail Message from Internet
504
Pre-Screen Messages for Blocked/Approved Sources
528
Blocked
Approved
Discard Message
532
Neither
Any Keywords?
536
Yes
No
Determine If Message is Probably Unsolicited
506
Suspect?
508
No
Yes
Sort Into Mailbox Folders
512
Move to Bulk Mail Folder
516
Refute Determination That Message is Solicited
520
Refute Determination That Message is Unsolicited
524

Fig. 5F

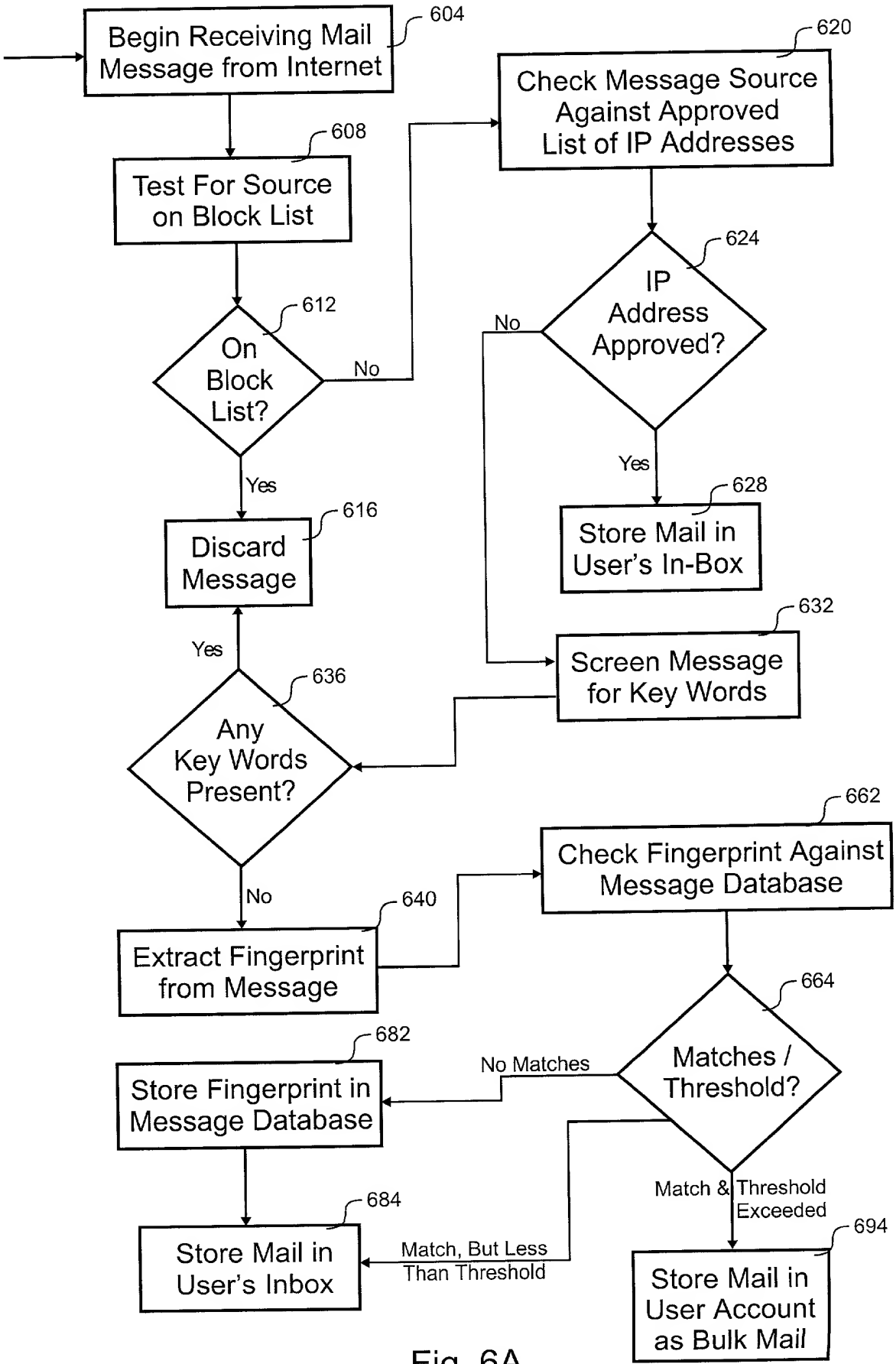
Begin Receiving Mail Message from Internet
604
Test For Source on Block List
608
On Block List?
612
No
Yes
Discard Message
616
Yes
Any Key Words Present?
636
No
Extract Fingerprint from Message
640
Check Message Source Against Approved List of IP Addresses
620
IP Address Approved?
624
No
Yes
Store Mail in User's In-Box
628
Screen Message for Key Words
632
Check Fingerprint Against Message Database
662
Matches / Threshold?
664
No Matches
Store Fingerprint in Message Database
682
Store Mail in User's Inbox
684
Match, But Less Than Threshold
Match & Threshold Exceeded
Store Mail in User Account as Bulk Mail
694

Fig. 6A

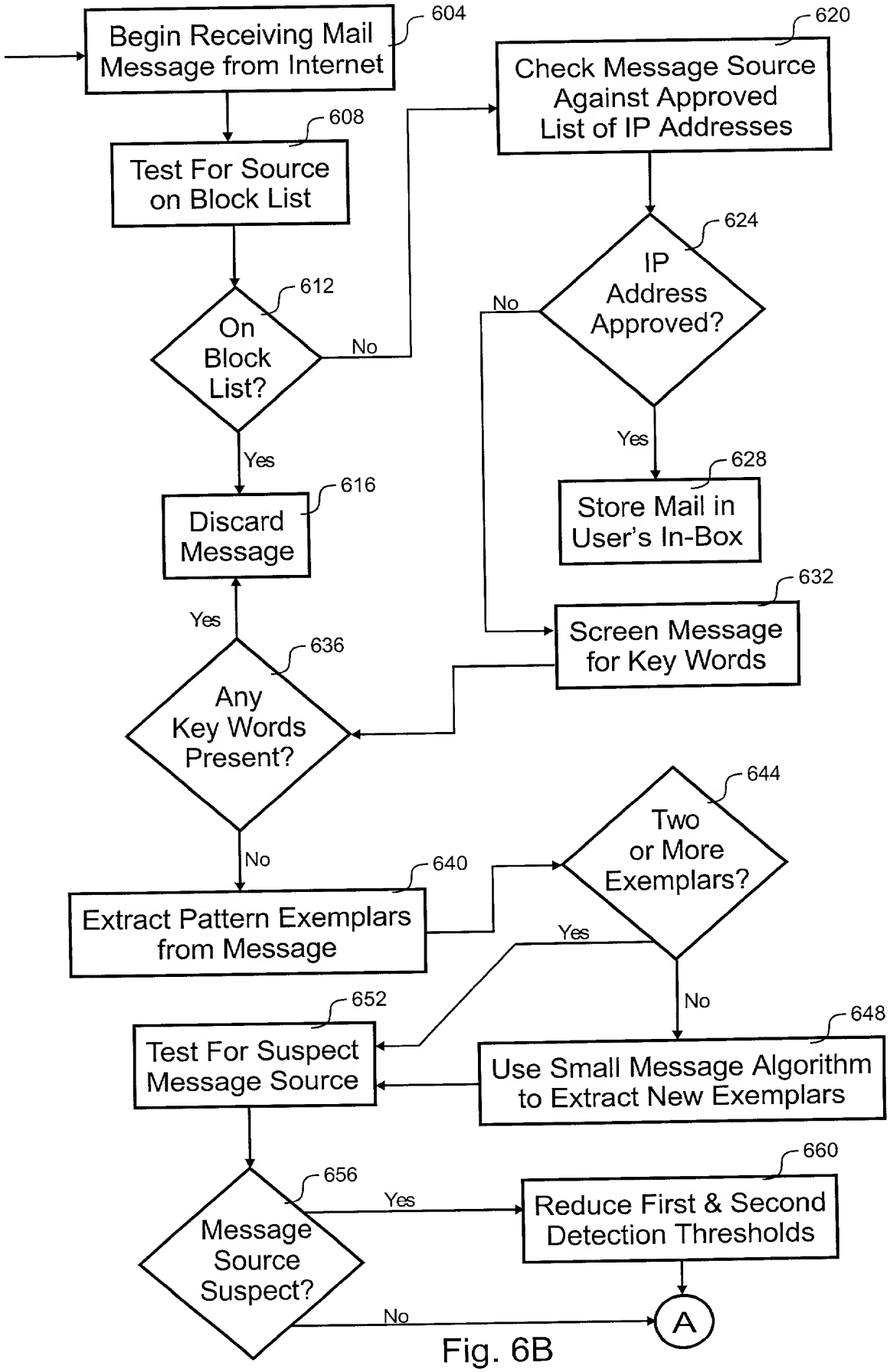
Begin Receiving Mail Message from Internet
604
Test For Source on Block List
608
On Block List?
612
No
Yes
Discard Message
616
Check Message Source Against Approved List of IP Addresses
620
IP Address Approved?
624
No
Yes
Store Mail in User's In-Box
628
Screen Message for Key Words
632
Any Key Words Present?
636
Yes
No
Extract Pattern Exemplars from Message
640
Two or More Exemplars?
644
Yes
No
Use Small Message Algorithm to Extract New Exemplars
648
Test For Suspect Message Source
652
Message Source Suspect?
656
Yes
No
Reduce First & Second Detection Thresholds
660
A

Fig. 6B

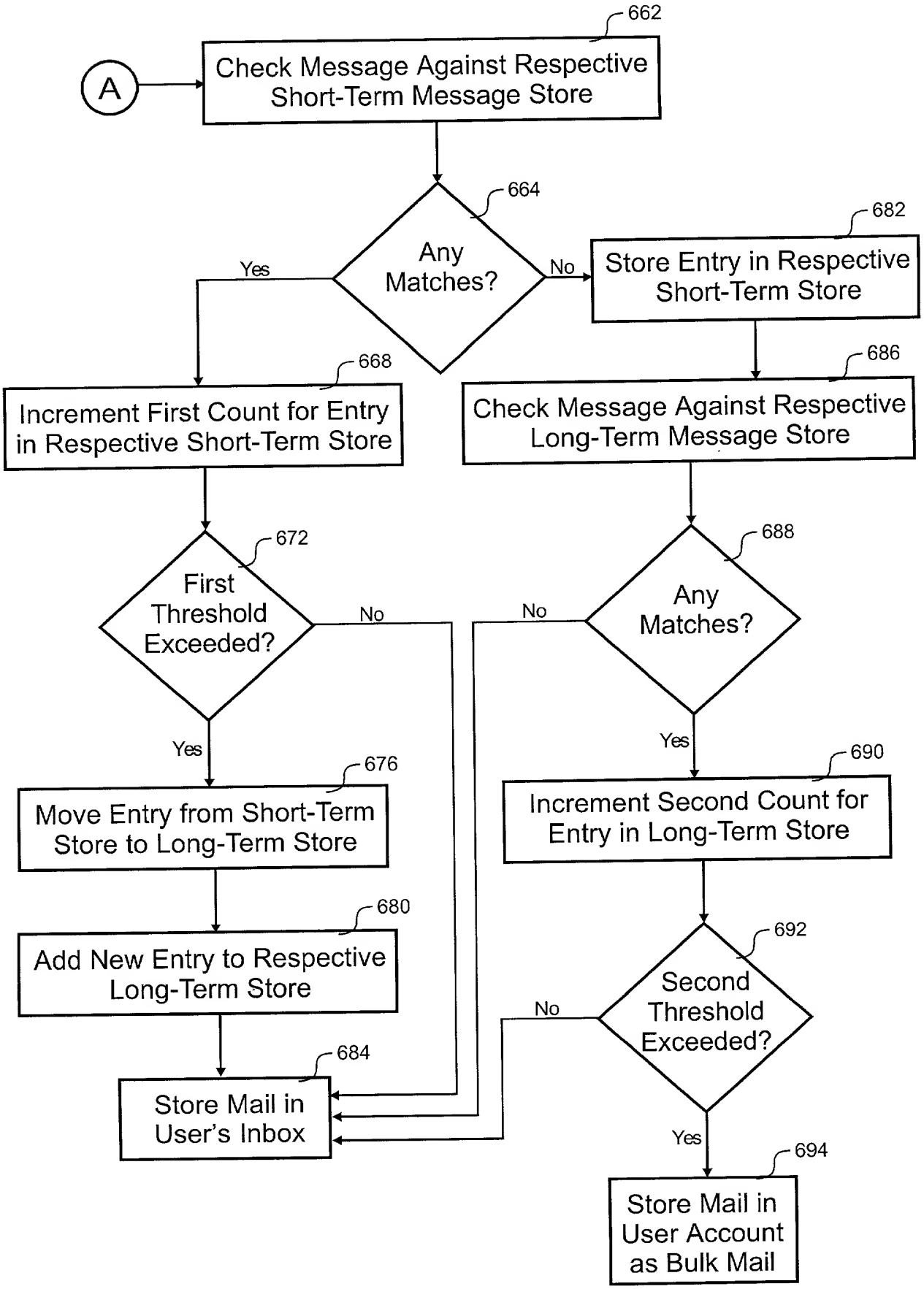
A
662
Check Message Against Respective Short-Term Message Store
664
Any Matches?
Yes
No
682
Store Entry in Respective Short-Term Store
668
Increment First Count for Entry in Respective Short-Term Store
686
Check Message Against Respective Long-Term Message Store
672
First Threshold Exceeded?
No
Yes
688
Any Matches?
No
Yes
676
Move Entry from Short-Term Store to Long-Term Store
690
Increment Second Count for Entry in Long-Term Store
680
Add New Entry to Respective Long-Term Store
692
Second Threshold Exceeded?
No
Yes
684
Store Mail in User's Inbox
694
Store Mail in User Account as Bulk Mail

Fig. 6C

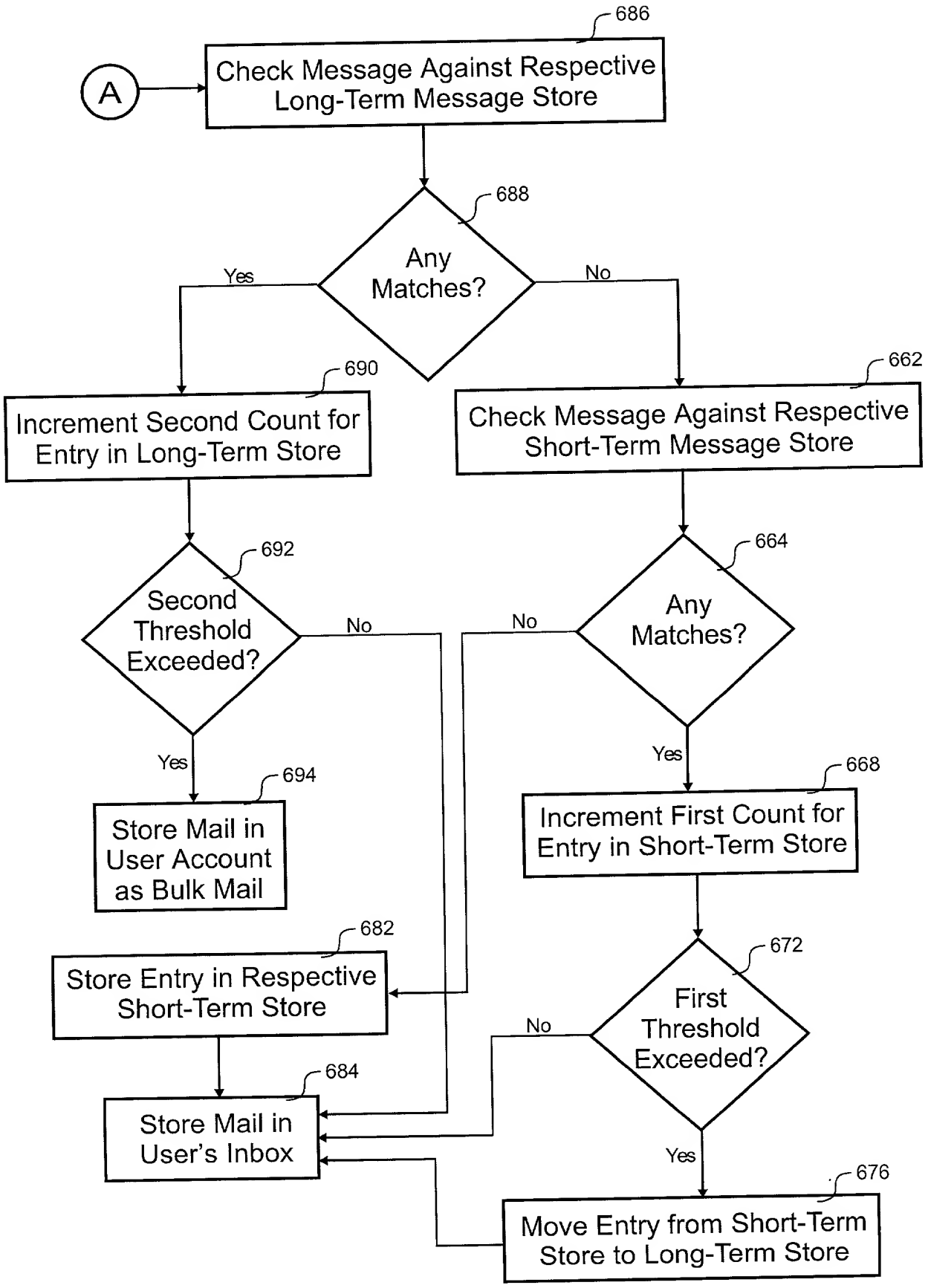
A
686
Check Message Against Respective Long-Term Message Store
688
Any Matches?
Yes
No
690
Increment Second Count for Entry in Long-Term Store
662
Check Message Against Respective Short-Term Message Store
692
Second Threshold Exceeded?
No
Yes
694
Store Mail in User Account as Bulk Mail
664
Any Matches?
No
Yes
668
Increment First Count for Entry in Short-Term Store
682
Store Entry in Respective Short-Term Store
672
First Threshold Exceeded?
No
684
Store Mail in User's Inbox
Yes
676
Move Entry from Short-Term Store to Long-Term Store

Fig. 6D

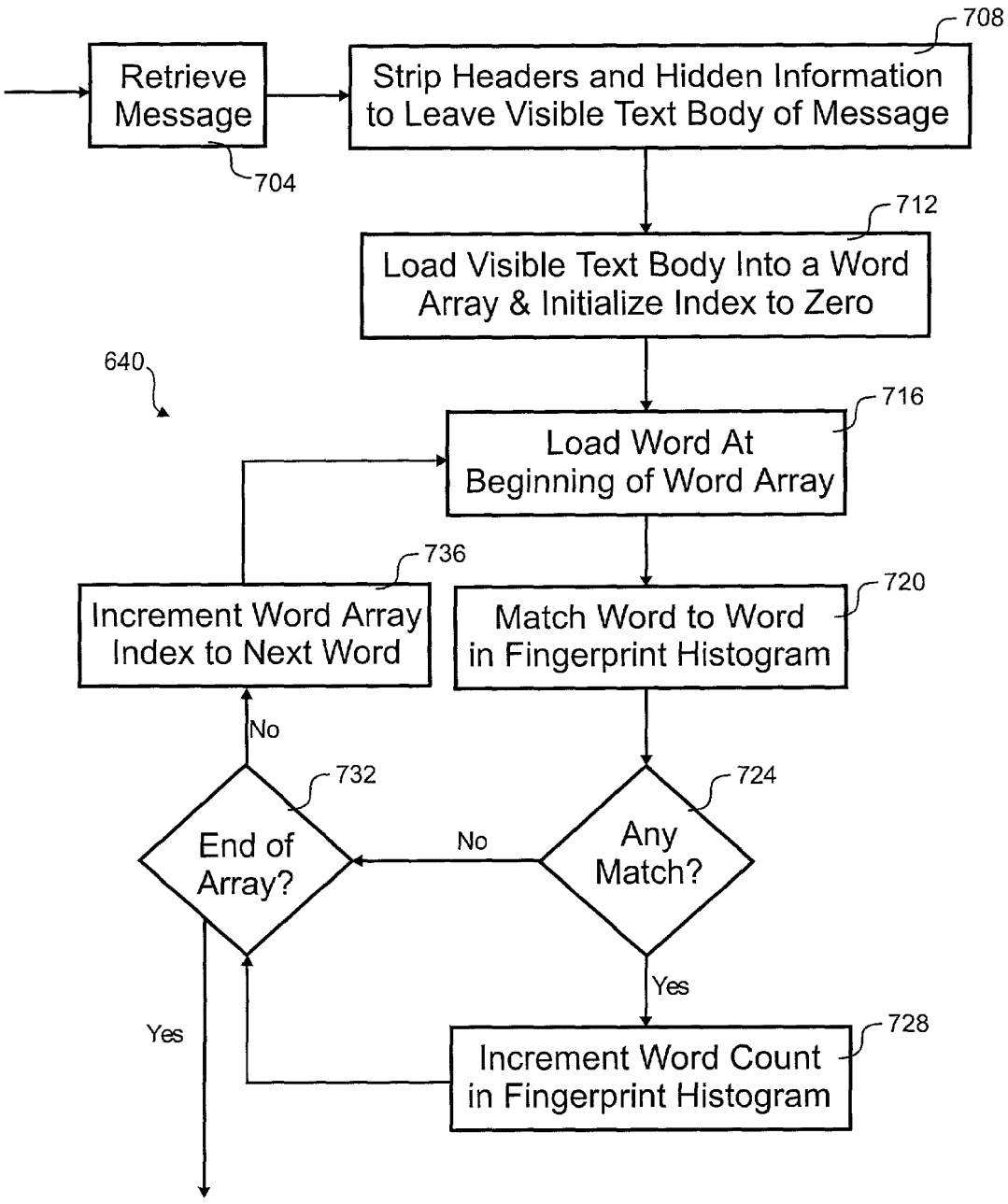
Retrieve Message
704
Strip Headers and Hidden Information to Leave Visible Text Body of Message
708
Load Visible Text Body Into a Word Array & Initialize Index to Zero
712
640
Load Word At Beginning of Word Array
716
Match Word to Word in Fingerprint Histogram
720
Any Match?
724
No
End of Array?
732
No
Increment Word Array Index to Next Word
736
Yes
Increment Word Count in Fingerprint Histogram
728
Yes

Fig. 7A

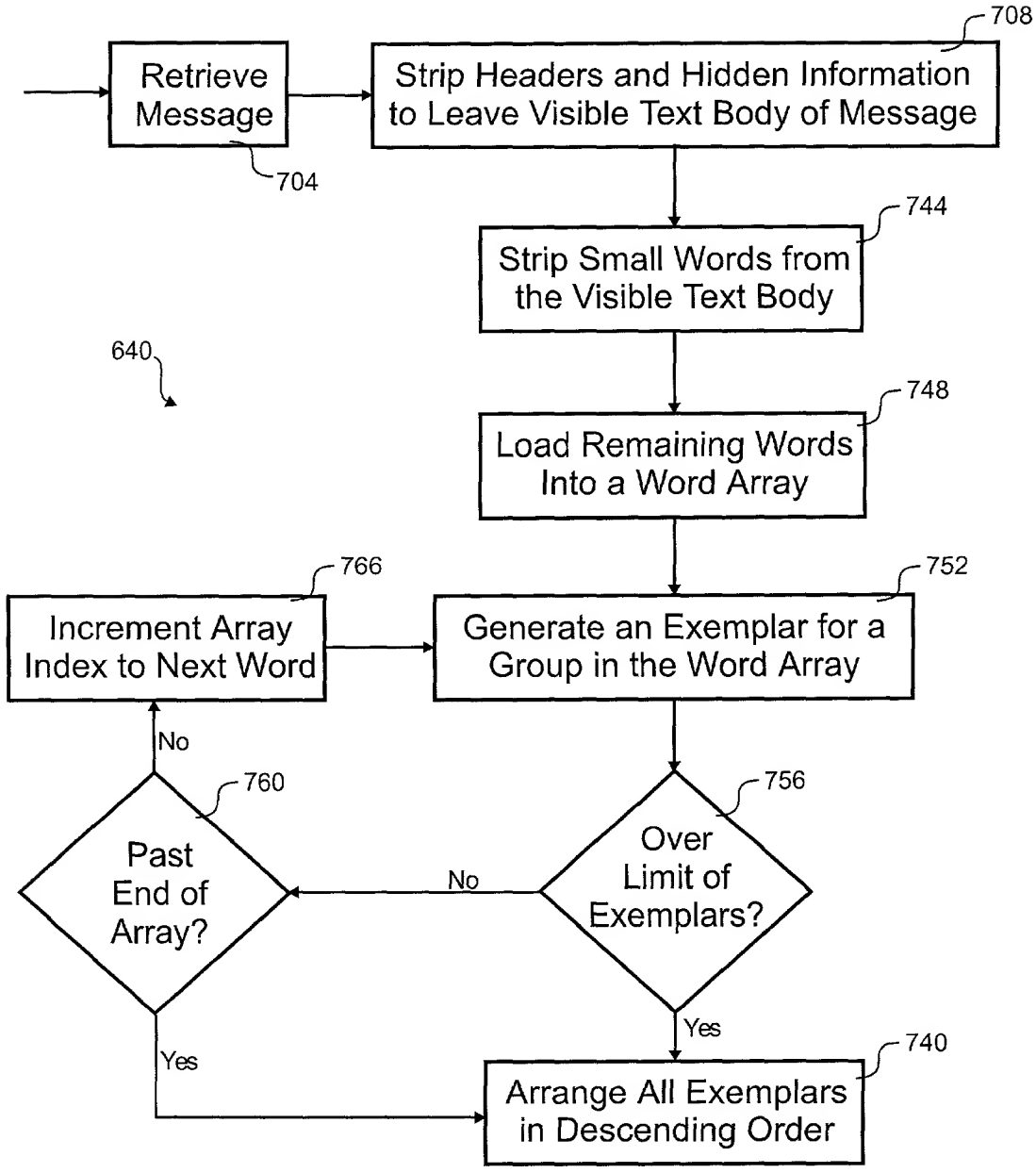
Retrieve Message
704
Strip Headers and Hidden Information to Leave Visible Text Body of Message
708
Strip Small Words from the Visible Text Body
744
640
Load Remaining Words Into a Word Array
748
Increment Array Index to Next Word
766
Generate an Exemplar for a Group in the Word Array
752
No
Past End of Array?
760
No
Over Limit of Exemplars?
756
Yes
Yes
Arrange All Exemplars in Descending Order
740

Fig. 7B

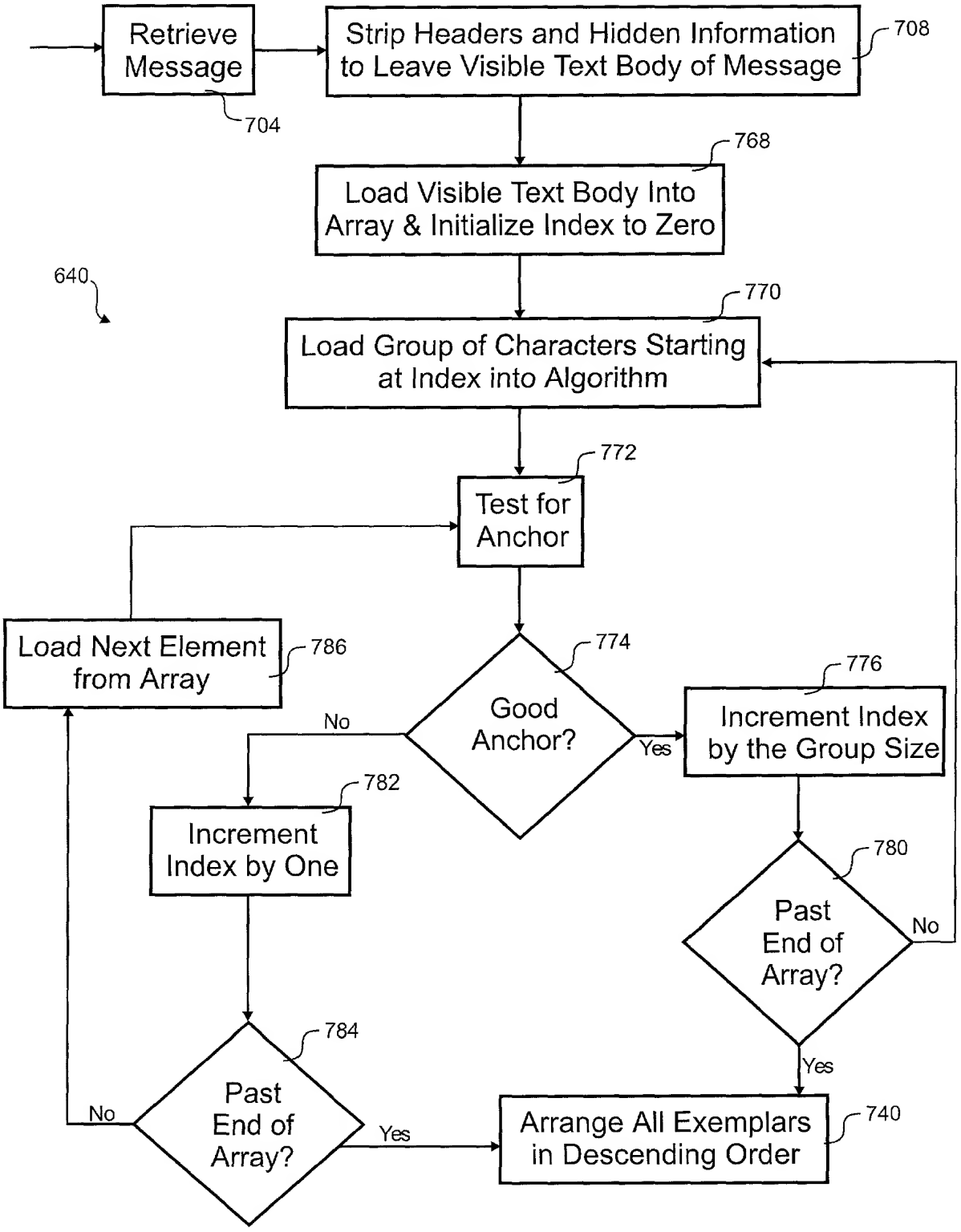
Retrieve Message
704
Strip Headers and Hidden Information to Leave Visible Text Body of Message
708
Load Visible Text Body Into Array & Initialize Index to Zero
768
640
Load Group of Characters Starting at Index into Algorithm
770
Test for Anchor
772
Load Next Element from Array
786
Good Anchor?
774
No
Yes
Increment Index by the Group Size
776
Increment Index by One
782
Past End of Array?
780
No
Yes
Past End of Array?
784
No
Yes
Arrange All Exemplars in Descending Order
740

Fig. 7C

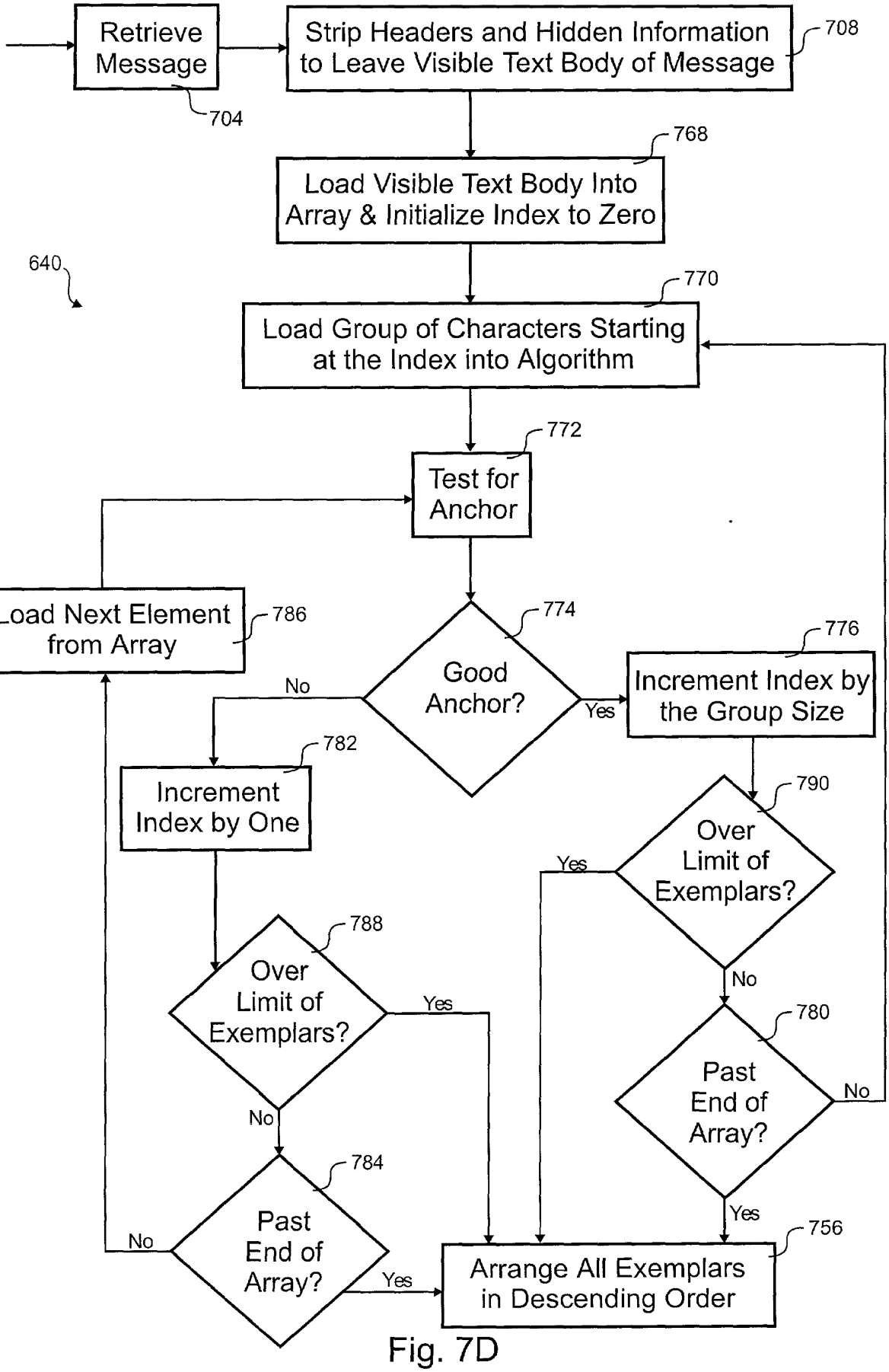
Retrieve Message
704
Strip Headers and Hidden Information to Leave Visible Text Body of Message
708
Load Visible Text Body Into Array & Initialize Index to Zero
768
640
Load Group of Characters Starting at the Index into Algorithm
770
Test for Anchor
772
Load Next Element from Array
786
Good Anchor?
774
No
Yes
Increment Index by the Group Size
776
Increment Index by One
782
Over Limit of Exemplars?
790
Yes
No
Over Limit of Exemplars?
788
Yes
No
Past End of Array?
780
No
Yes
Past End of Array?
784
No
Yes
Arrange All Exemplars in Descending Order
756

Fig. 7D

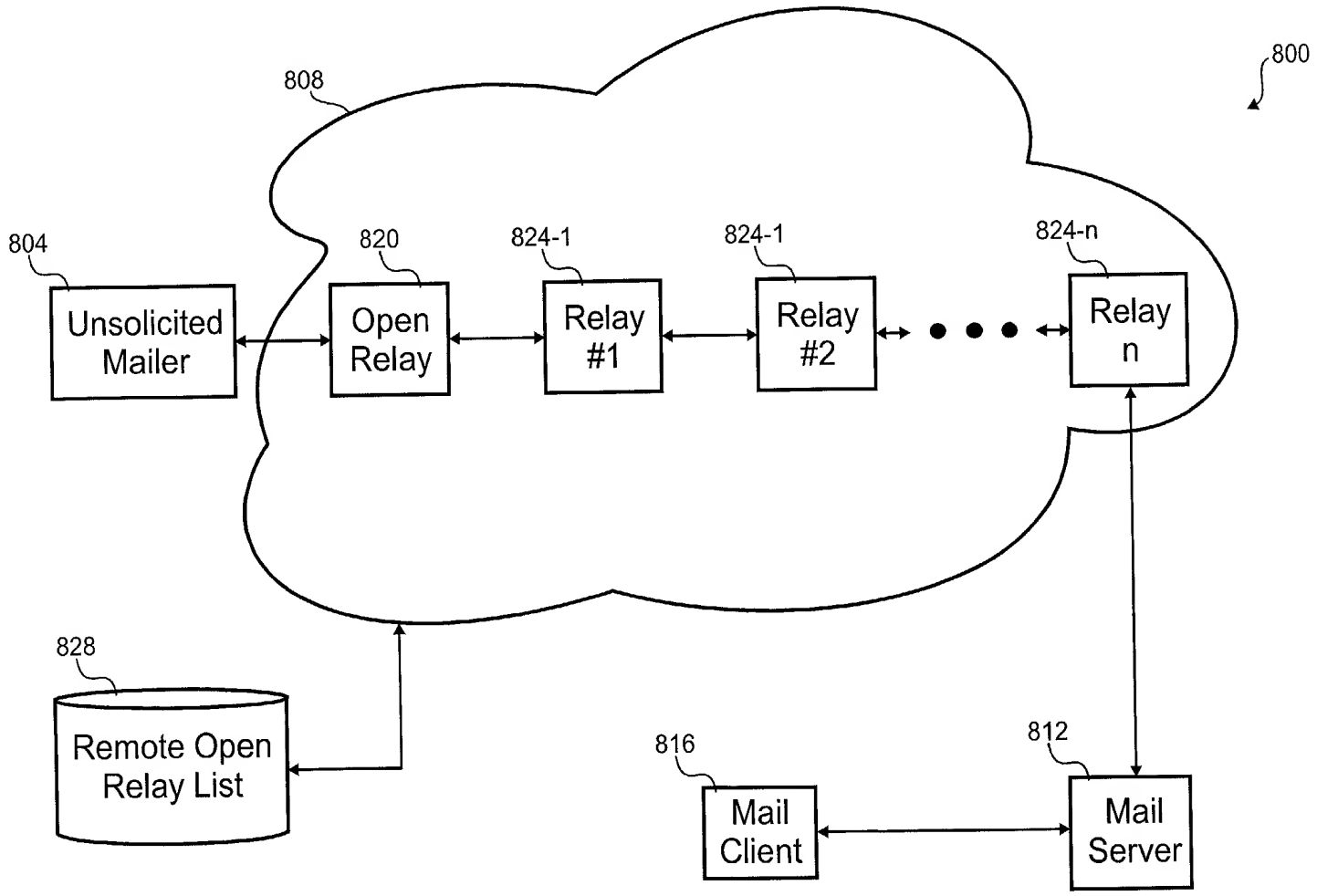
800
808
804
820
824-1
824-1
824-n
Unsolicited Mailer
Open Relay
Relay #1
Relay #2
Relay n
828
Remote Open Relay List
816
812
Mail Client
Mail Server

Fig. 8

Fig. 9 (Prior Art)

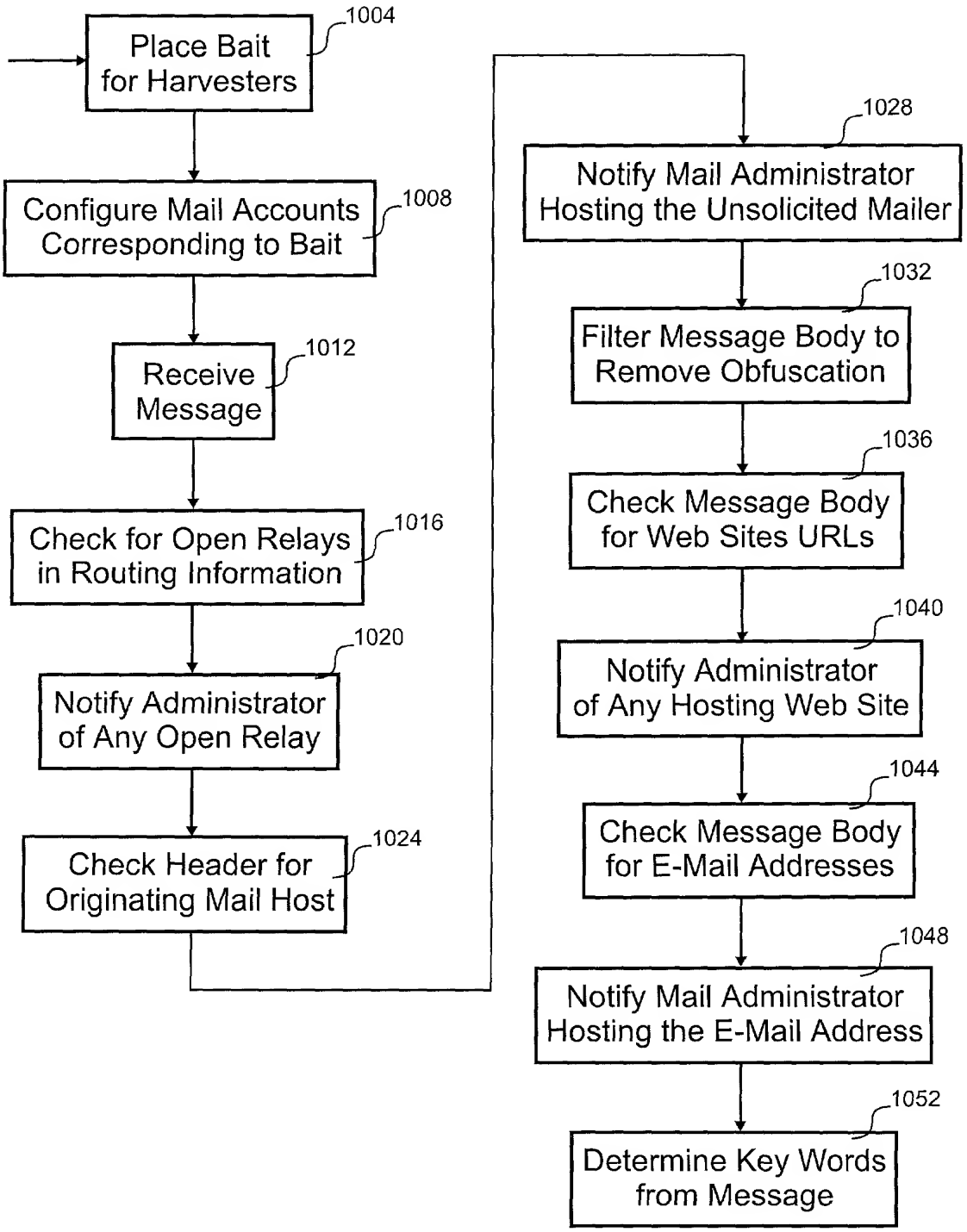
Place Bait for Harvesters
1004
Configure Mail Accounts Corresponding to Bait
1008
Receive Message
1012
Check for Open Relays in Routing Information
1016
Notify Administrator of Any Open Relay
1020
Check Header for Originating Mail Host
1024
Notify Mail Administrator Hosting the Unsolicited Mailer
1028
Filter Message Body to Remove Obfuscation
1032
Check Message Body for Web Sites URLs
1036
Notify Administrator of Any Hosting Web Site
1040
Check Message Body for E-Mail Addresses
1044
Notify Mail Administrator Hosting the E-Mail Address
1048
Determine Key Words from Message
1052

Fig. 10

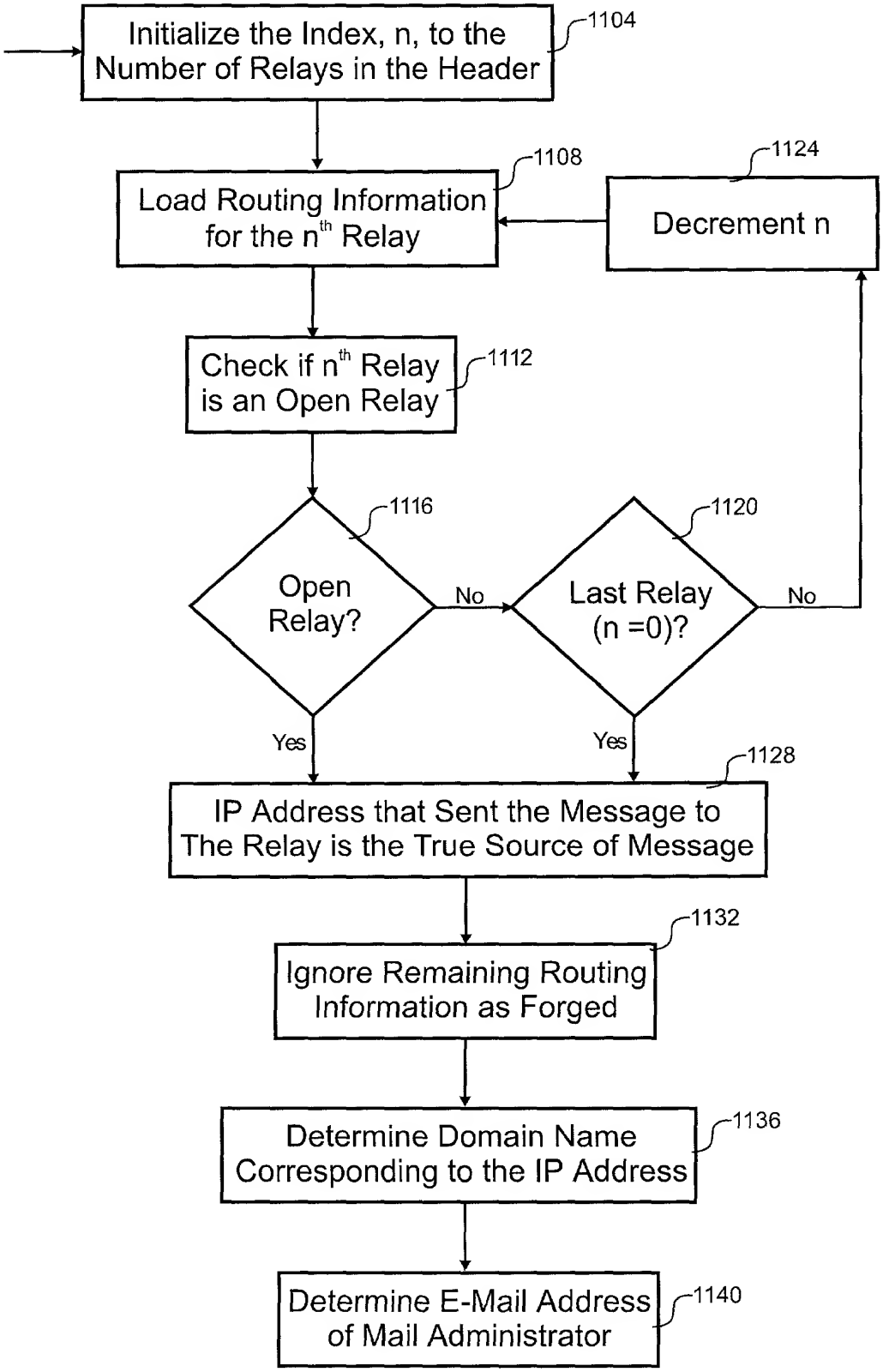
Initialize the Index, n, to the Number of Relays in the Header
1104
Load Routing Information for the nth Relay
1108
Decrement n
1124
Check if nth Relay is an Open Relay
1112
Open Relay?
1116
No
Last Relay (n =0)?
1120
No
Yes
Yes
IP Address that Sent the Message to The Relay is the True Source of Message
1128
Ignore Remaining Routing Information as Forged
1132
Determine Domain Name Corresponding to the IP Address
1136
Determine E-Mail Address of Mail Administrator
1140

Fig. 11

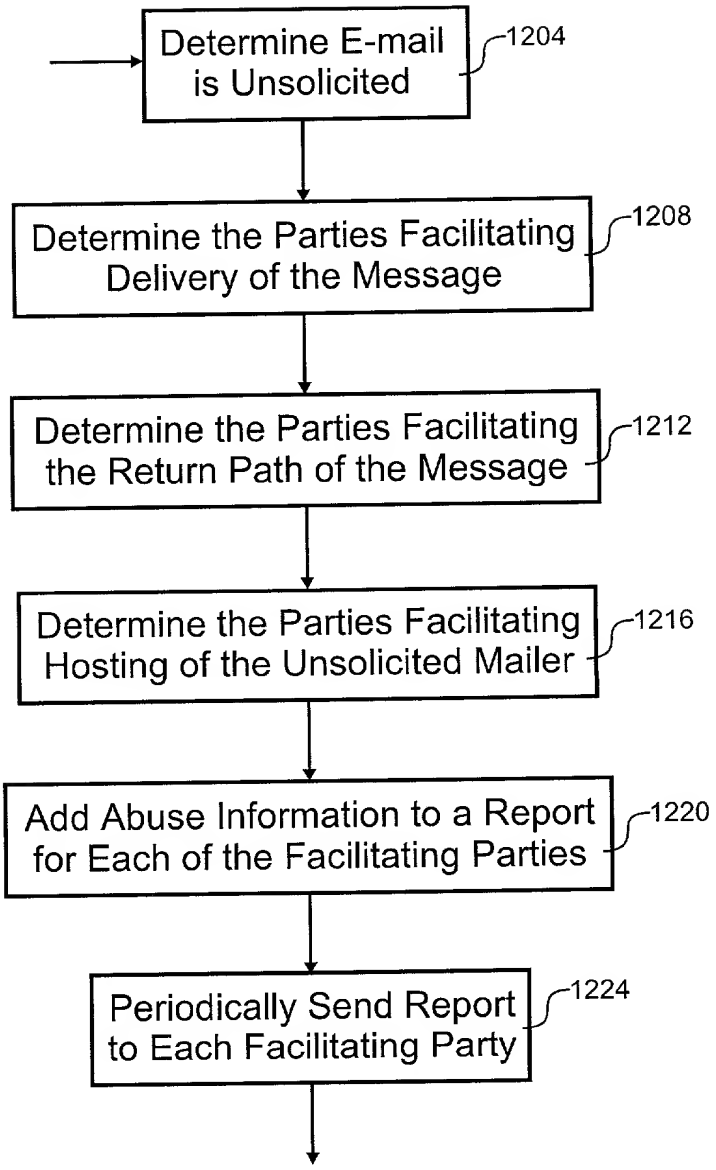
Determine E-mail is Unsolicited
1204
Determine the Parties Facilitating Delivery of the Message
1208
Determine the Parties Facilitating the Return Path of the Message
1212
Determine the Parties Facilitating Hosting of the Unsolicited Mailer
1216
Add Abuse Information to a Report for Each of the Facilitating Parties
1220
Periodically Send Report to Each Facilitating Party
1224

Fig. 12